

Freeze-Drying Is Key to Saving Fungal Collection

Imagine. The scientists worked for months on an experiment, and then it happened: The fungal species that was critical to the entire experiment was accidentally cross-contaminated. The researchers had been working on harvesting a gene that produces a key enzyme from a very special fungus. “No problem,” says taxonomist Maren Klich. She has pure inventory of exactly the fungal species needed to regroup. Experiment saved.

This is the kind of taxonomical rescue Klich conducts. She has been curator for nearly 30 years of the ARS Southern Regional Research Center’s (SRRC) 1,700 strains that make up the Fungal Culture Collection.

The collection is critical to the day-to-day work of career scientists who work at SRRC and beyond. Interestingly, Klich chose a method of preserving the collection that is essentially “the closest thing to putting microbes into suspended animation,” she says.



She and colleagues actually freeze-dry tiny amounts of a fungal species.

In a small vacuum tube, water is removed from the frozen fungi.

That suspends the life of the live organism. Fungi can stay in that condition for 50 years or more.

“You end up with white pellets that can be resuspended,” says Klich. “We immerse the pellet in a liquid, and place the suspension on a petri dish containing agar, and the mold grows right out—it comes back to life.”

Another way the team could have chosen to preserve their live fungi was to freeze them in liquid nitrogen. “But if we had gone that route, we would have lost the entire collection during Hurricane Katrina,” says Klich.

After Katrina, evacuee scientists were barred from returning to SRRC, so they would not have been able to keep cultures frozen. “You have to replenish the liquid nitrogen, and we just could not do that after Katrina,” she says.

But when Klich was allowed to return, she found the collection safe and sound. She then turned her attention to helping other agencies identify potentially dangerous mold species that could occur as a result of water damage from the storm.—By **Rosalie Marion Bliss**, ARS.

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Tropical Treasure Turns 60

The Cotton Winter Nursery (CWN) in Tecoman, Mexico, is a vital resource for both maintenance of cotton germplasm and faster variety development. The CWN will turn 60 in 2010, making it one of the longest running cooperative facilities of its kind. Since its inception, it has been operated jointly by the Agricultural Research Service, the National Cotton Council of America, and the Mexican Institute of Forestry, Agriculture, and Livestock Research, Mexico’s ARS equivalent. Government, academic, and industry scientists serve on an advisory committee.

A comprehensive collection of cotton’s genetic diversity is essential for protecting and enhancing the nation’s \$3.8 billion cotton crop. Scientists conduct research on genetic diversity to help improve key agronomic traits for cotton. For example, cotton breeders seek to develop plants that produce long, strong fibers of uniform length and are resistant to pest, pathogens, and environmental extremes.

With more than 9,000 lines, or “accessions,” the ARS Cotton Germplasm Collection in College Station, Texas, is a storehouse of unique genetic matter that could prove useful for increasing yields, improving fiber quality, and controlling future pests and pathogens. The CWN plays a major role in maintaining the viability of this collection. Cotton seeds stay viable for at least 10 years, but each accession kept at College Station must be raised from seed once every decade to maintain vigor. Many wild-collected accessions, essential for the collection’s genetic diversity, require the shorter days common in the nursery’s tropical location in order to reproduce. So the CWN is ARS’s primary site for producing new cotton seeds and plants. Says James Frelichowski, the collection’s curator, “We send between 900 and 1,000 cotton accessions to the CWN each year for seed increase.”

Cotton is particularly susceptible to pests and pathogens, and some experts attribute the recent stagnation in cotton yields to the crop’s narrow genetic base. But less than 1 percent of the plant’s genetic base has been explored. Scientists from ARS and many universities, state agricultural experiment stations, and private companies are currently conducting more than two dozen research projects at the CWN to identify genes from exotic and wild cotton plants that may improve fiber quality, increase yields, resist pests and pathogens, and enhance drought tolerance.

The CWN’s tropical location shortens the time required to study and develop new varieties, because scientists can raise two generations of cotton each year. “We can plant cotton in September in Mexico, take seeds from that crop in March or April, and plant the progeny seed in April or May of that same year in the southern United States,” says Frelichowski. Thus, the nursery plays a key role not only in maintaining a vital cotton collection, but also in developing new cotton varieties.—By **Dennis O’Brien**, ARS.

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